THE ROLE OF THE GROIN FLAP IN THE RECONSTRUCTIONS OF THE UPPER EXTREMITY

Sait ADA (*), Arslan BORA (**), Yalçın ADEMOĞLU (*), Fuat ÖZERKAN (*), İbrahim KAPLAN (*)

ABSTRACT

Many Techniques are avaliable in the reconstruction of the upper extremity. The Groin flap has many advantages such as being reliable and suitable to cover large areas, having an easy dissection, enabling primary closure of the donor site and not necessitating microsurgical techniques as well as disadvantages like requiring immobilization, decreasing the comfort of the patient, preventing elevation of the extremity and the thickness of the flap.

Aim in this article is to report our results and complications of the 33 pediculate groin flaps between the years of 1986 and 1992 in the reconstruction of the upper extremity. Total flap loss was not observed in any of the patients. Partial necrosis was seen at the distal part of the flap in three cases. The dorsal side of the distal upper extremity was the most frequently applied region. The donor site of all of the patients was closed primarily.

Key words : Groin flap, reconstruction, upper extremity.

THE ROLE OF THE GROIN FLAP IN THE RECONSTRUCTIONS OF THE UPPER EXTREMITY

Several alternatives for closing a wound could be direct closure, primary closure leaving it to secondary healing, covering it with split thickness or full thickness skin graft, local or distant flap, or free flap application.

One of these alternatives is the pedicled groin flap which does not necessitate microvascular surgery and which is a reliable, easy and fast technique. This flap, which was first defined by Mc Gregor and Jackson in 1972, is also named the Mc Gregor flap (4).

The axial-pattern flap is based on the principal of the perfusion of a wide tissue mass by a rather big vessel. The artery of the Groin flap is the *Superficial circumflex iliac artery*. This vessel has been determined in the angiography and cadaver studies with a rate of 96 %. It is generally emerged from the femoral artery approximately 2.5 cm below the midway point of the inguinal ligament (3,5) (Figure 1).

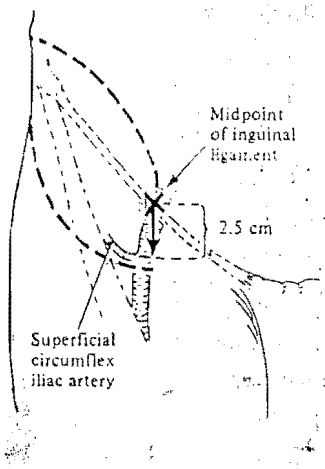

Fig. 1: Emerging Point of the superficial circumflex iliac artery (From: Practical Guide to Free Tissue Transfer. Webster, M.H.L. and Souter, D.S.)

Aim in this article is to report our results and complications of the 33 pediculate groin flaps in the reconstruction of the upper extremity.

METHOD AND MATERIAL

Pedicled Groin flap was used in 33 cases between the years of 1986 and 1992 in the İzmir Hand and Microsurgery Hospital and in Buca SSK Hospital. The ages of the cases, four of which were female and twenty-nine male, varies from two to 46 with a mean of 23.6.

(*) *İzmir, Hand and Microsurgery Hospital, Medical Doctor, Hand Surgeon.*

(**) *İzmir, Hand and Microsurgery Hospital, Assos. Prof., Hand Surgeon.*

Groin flap was applied in the crush type injuries in 18 patients, avulsion type injuries in four patients and skin defect in two patients, which had resulted from a burn contracture around the hand the wrist. The grown flap was also applied as a tube to preserve the length of the finger in the unsuccessful replantation and revascularization operations in 9 patients (Table 1).

Table 1 : Etiology of Upper extremity defects.

Crush Injury	18
Avulsion Injury	4
Burn Contracture	2
Failed Finger Replantations	9

Groin flap was used in seven patients as primary (in 24 hours), in nine patients as late primary (1-10 days) and in 17 patients as secondary (after 10 days) operation. All of the flaps were applied according to the method defined by Mc Gregor and Jackson (4). The length of follow-up ranged from three years to eight years with an average of 5.5 years.

RESULTS

All of the flaps in our series were vital when they were removed and applied to the defected zone. Total flap loss was not observed in any of the patients. Partial necrosis was seen in the distal part of the flap of three cases and in cases of which the Groin flap was applied as a tube for the ring injury. Necrotic portion of the flap of these patients was excised, the distal phalanges were removed and the finger tip was closed. The reason of the necrosis on the distal edge in the third patient was determined as a hematoma under the flap. The problem was solved by excising the necrotic part and reattaching the flap.

The areas on which the flap was most frequently applied are the dorsal site of the hand and wrist, and the distal forearm (Table 2).

Table 2 : Region flap application

Dorsum of the Hand, Wrist and Forearm region	14
Palmar side of Hand, Wrist and Forearm region	5
Tube form for the thumb	5
Tube form for one finger	4
Dorsum of the thumb	2
More than one finger	3

Avascular bone graft was employed in five patients, two of which were from the iliac crest and the other three from the amputated parts, to preserve the length of the finger. Resorption occured in one of the iliac grafts and in two of the amputated part grafts. A total of 19 secondary operations were performed on the 13 cases after closing the defect by the Groin flap (Table 3).

Table 3 : Secondary procedures the Groin Flap.

Tenolysis	3
Tendon Graft	2
Tendon Transfer	4
Nerve Graft	1
Capsulotomy	2
Bone Graft	3
Neurovascular Island Flap	2
Arthrodesis	2
Total	19

Fig. 2: A Two years old patient with avulsion and crush type amputations of three fingers. Preservation of the finger length by using bone graft from amputated part.

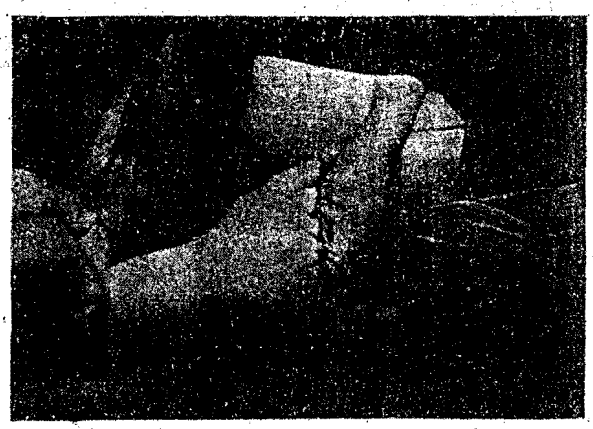

Fig. 3: Covering of the fingers with the pedicled Groin flap.

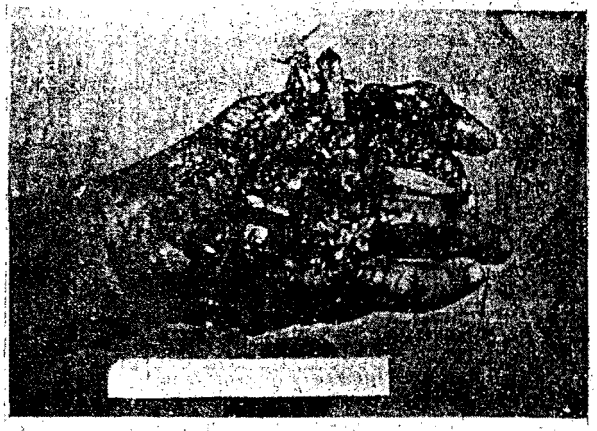

Fig. 4: A Sixteen years old patient. Traffic accident causes severe crush injury at the dorsum of the hand.

Fig. 5: After debridement and internal fixation of fractures covering the defect with the pedicled Groin Flap.

A limited amount of defatting procedure was performed in three of the patients after the postoperative 6th month because of their complaint about the bulkiness of the flap and another operation was performed to open the syndactylised fingers in one patient. The donor site in all of the patients was closed primarily. Postoperatively limited motion was observed in the shoulder and elbow joint of the two patients. The duration of hospitalization varies from two days to 28 days with an average of 12 days.

Fig. 6: Burn contracture around the wrist and the thumb.

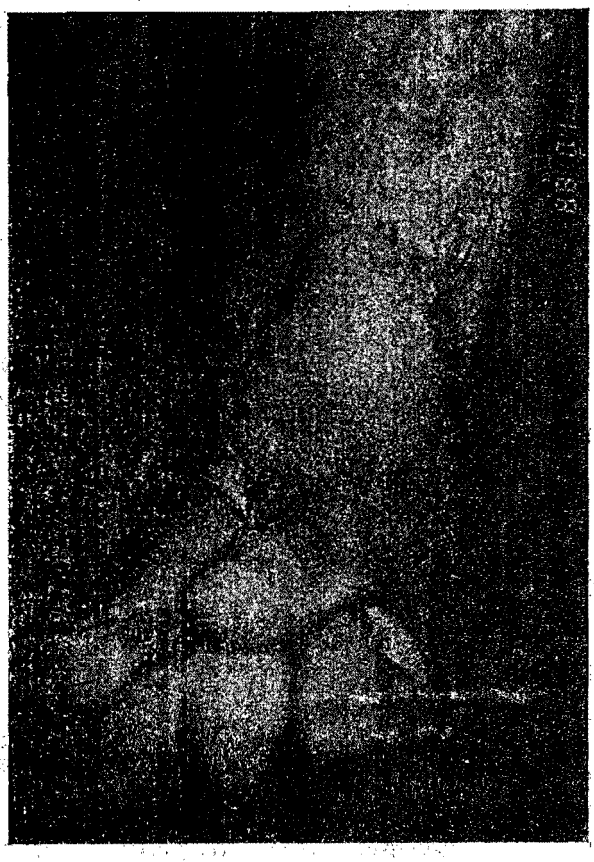

Fig. 7: After release of contracture covering the palmar side of the wrist by the pedicled flap and the functional result.

DISCUSSION

There are very critical disadvantages of leaving wide skin defects to secondary healing or covering them with full or split thickness skin grafts such as causing tendon adhesions or contractures of the upper extremity and making the secondary operations to be performed impossible. For this reason, the groin flap is one of the several methods we apply in this type of patients to supply sufficient vascularisation and a healty skin cover which enables secondary operations to be performed.

In our series of 33 cases, the Groin flap had been used in 7 cases primarily, in nine cases late primarily and in 17 cases secondarily. Distal tip (edge) necrosis was observed in one flap of the primarily and in two flaps of the secondarily applied group. Total flap loss did not occur on any of our patients therefore this shows the reliability of this flap.

Mc Gregor and Jackson and Webiter and Souter reported that this flap is one of the widest flaps and that the width of it can extend to 18 centimeters (4, 5). The size of the widest flap in our series was 10 x 15 centimetres.

Forming the basis of the flap into a tube is the factor which decreases the infection and maserat'or complication (2). However maseration and superficial infections developed in most of our patients and thes. improved by the division of the flap. No deep infection caused by the flap was observed.

The detachment of the flap on the recipient site was not observed in any of our patients including the children. We believe that, firm dressing and the control of the flap from a small openning on the dressing has been effective on this.

Chow et al have reported the complication rate as 6 % for the 36 cases; 25 of which were applied late primary and 11 secondary. (1)

Wray et al have reported partial necrosis on the medial side of 18 % of them cases following the elivision of the pedicule (6). Chow et al stated put forward the idea that this complication arose from the usage of the pedicule area, which was formed into a tube, for covering the division procedure. They also expressed that there is a high possibility of medial edge necrosis especially in the wounds that does not allow sufficient revascularisation following the flap division (1). No such complication was noted in any of our patients.

The Groin flap has many advantages such as being reliable and suitable to cover the large areas, having an easy dissection, enabling primary closure of the donor site and not necessitating microsurgical techniques as well as disadvantages like requiring immobilization, decreasing the comfort of the patient, preventing elevation of the extremity and the thickness of the flap.

Recently, we prefer free tissue transfers to distant pedicled flaps for the reconstruction of the soft tissue defects at the upper extremity.

However, we believe that it is a reliable flap to employ with a combination of other flaps in the situations that microvascular surgery is not possible or for the loss of both the palmar and the dorsal sites like total degloving of the hand.

REFERENCES

1– *Chow, J.A., Bilas, Z.J., Hui, P., Hall, R.F., Seyfer, A.E. and Smith, A.C.: The Groin Flap in Reoperative Surgery of the Hand. Plast. Reconstr. Surg., 77:3, 421-425, 1986.*

2– *Graf, P. and Bizner, E., Morbidity of the Groin Flap Transfer: Are we Getting Something for Nothing? Br. J. Plast. Surg., 45:2, 86-88, 1992.*

3– *Gay, J.W., Littler, J.W., Groin Flap. In. Mc Carthy, O.G. Plastic Surgery. Saunder Com., 7: 4462-4463, 1990.*

4– *Mc Gregor, I.A. and Jackson, I.T., The Groin Flap, British Journal of Plast. Surg., 25:3, 1972.*

5– *Webster, M.H.C., Souter, D.J., Practical Quide to Free Tissue Transfer. Butterworths, London, 72-76, 1986.*

6– *Wray, R.C., Wise, D.M., Young, V.L., and Weeks, P.M., The Groin Flap in Severe Hand Injuries. Ame. Plast. Surg., 9: 459, 1982.*